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COMPARISON OF THE PROVISIONAL SCHEMES OF THE CLASSIFICATION OF BIRDS.¹

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IT is not my intention in the present paper to offer any scheme of my own for the classification of birds, although it is a question that has long engaged my attention, and I hope soon to publish, in another connection, a provisional scheme, presenting what I take to be a natural taxonomy of Aves in so far as it is now understood. My only object here is to offer a few brief remarks upon the more prominent schemes for the classification of birds which have been put forward within recent times, and in a way compare the views of their sponsors. Careful recapitulation, undertaken from time to time, is always an advantage to any science, especially if that recapitulation is made along comparative lines and according to scientific methods. In other activities in which men engage, the benefits attaching to the occasional calling of a halt, with the view of taking account of the progress made; to making sure that advancement is being made along the right lines, has always been recognized. This, too, holds true in the domain of ornithological science. In fact, those who make the greatest, the surest and most substantial progress in anything are the ones who command a digested and available knowledge of all that has been previously accomplished in the field in which they labor.

It will be a red-letter day for our science when any species or subspecies of birds is and are known throughout the world by the same name, vernacular or scientific. That is, the opinion in regard to nomenclature will be unanimous. There will be equal rejoicing when that day arrives, when a unanimity of opinion exists in regard to the classification of birds. It is quite possible that many species now existing in the world's avi-

¹ Read by title at the twenty-first Congress of the American Ornithologists' Union, held at the Academy of Natural Sciences of Philadelphia, 1903.

fauna will, when that time comes, be extinct. With nomenclature I have nothing to do. Names are the inventions of men, whereas on the other hand, the relationships existing among birds in nature are actual, and in so far as invention enters here, it can only be in the form of printed, diagrammatic, or other device, to convey to the eye and mind what our conceptions of those relationships are. We may change names at any time and invent new ones *ad libitum*, but not so real relationships. These are fixed, and it remains for us to ascertain what they really are, and express them in the simplest terms. This is a matter of time, and I know of but two ways by means of which a consensus of opinion of ornithologists can be arrived at. First, by our mastering the morphology, geographical distribution, habits and life histories of all existing forms, and the osteology and other remains of all extinct ones within our ken; second, by the meeting of competent ornithologists in congress to discuss anything that touches upon the classification of the Class, and especially of the visible means of representing digested ideas in regard to it. Much could be accomplished by an international congress like the Second International Ornithological Congress which met at Budapest in 1891.

Of all the papers read at that Congress, none attracted more attention nor has been more useful or more closely studied since, than the paper read by Dr. R. Bowdler Sharpe, entitled "A Review of Recent Attempts to Classify Birds." It is the best thing of the kind extant and is so well known to ornithologists the world over as not to need further comment. I acknowledge with pleasure the assistance it has been to me in preparing the present paper. Apart from the many sound suggestions made by Dr. Sharpe in that address, and the historical lore it places at one's command, the main assistance I have derived from it has been the opportunity it affords me to study and to compare so many of the schemes of classification that have been proposed from time to time. To be sure, there now exist a number of other avian classifications. I refer especially to the classification of Aves proposed by Cope in 1889, entitled "Synopsis of the Families of Vertebrata," *The American Naturalist*, Vol. XXIII, pp. 849-877, and also to the taxonomic scheme brought forward by Gadow in

his contribution to the *Proceedings of the Zoölogical Society of London* for the year 1892, entitled "On the Classification of Birds," (pp. 229-256). So far as I am at present aware, Cope's and Gadow's classifications of Aves are the only two of any importance that have been published since Sharpe gave us his brochure cited above. If this be true, there has been no completed classification of this Class of Vertebrates published for over ten years. There have, however, been a number of such schemes partly completed and partly published, as for example the classification of birds as set forth in Sharpe's *Hand-List of Birds*, now passing through the press, and of which but one part remains to be issued. This admirable and most useful work will contain one of the most elaborate classifications of birds ever published. It is especially valuable inasmuch as Sharpe belongs to that school of ornithologists which believes in employing all available characters in classification, in ascertaining true affinities, to the end that the classification shall be a natural one and express as far as possible the real relationships of all existing families of birds, even to the minor divisions of species and varieties.

Within the past few years there have appeared some excellent summaries of classifications; for example, Ridgway's admirable presentation of the matter in his *Birds of North and Middle America*. "Nothing original is claimed for the classification here given," says its author, "except as to the form in which it is presented. It is simply the result of an elective process, the evidently good of other systems being retained and the obviously bad rejected, according to the author's ability to correctly interpret the evidence" (p. 6). In this connection I desire also to invite attention to the avian classification found in the *Catalogue of Osteological Specimens of the Museum of the Royal College of Surgeons of England* (Part III, Aves). This admirable piece of work is by Sharpe, who states that "The system of Classification followed in the present work is mainly that proposed by Henry Seebohm in his 'Classification of Birds,' and further elaborated in this 'Birds of the Japanese Empire.' There are some points in his system which I have slightly modified; but they are of minor importance when compared with the fact that every group of birds, as diagnosed by Seebohm, possesses a

combination of definite features, which are characteristic of the group, and of that group alone, be it Order or Suborder" (p. 1).

Finally, in many of the "Manuals" and "Keys" and "Hand-books" and "Check Lists" published in various countries, we have other classifications, but these, inasmuch as they do not enter upon the subject in its entirety, are apt to be more or less unsatisfactory and often misleading. The *Check-List of North American Birds*, prepared by a Committee of the American Ornithologists' Union" (Second and Revised Edition, 1895), is a very good example, for in it we find a classification that although it would be of great credit to a taxonomer of the Cuvierian epoch, it certainly can now only be regarded in the light of a curious bit of antiquated literature which it would be difficult to fit into any modern taxonomy of the Class Aves published since the days of such worthy pioneers as Nitzsch, Illiger, and Müller. As cited above this classification appeared in 1895, yet in 1901 when Ridgway, who was a member of the aforesaid Committee responsible for the classification in the "A. O. U. Check-List," published his own taxonomic scheme the latter differed so markedly from the former that to compare them is quite like making a comparison of Wilson's old single-barrel, flint-lock gun with the finely finished modern double-barrelled, hammerless piece now in the hands of the present day ornithologist.

It would seem that we at least ought to be in position at the present time, or certainly in the very near future, to decide upon the main groups into which the Class Aves is naturally to be divided, yet such is by no means the case. This is the more remarkable, inasmuch as all the important part of the development of avian classification dates no further back than the one proposed by Huxley in 1867. This scheme belongs to the literature of the Darwinian epoch and was influenced by what was then known of the law of organic evolution, and consequently is the first scheme of classification worthy of our consideration. Huxley divided the Class into three orders, the Saururæ, the Ratitæ, and the Carinatae, and these three orders were divided into their suborders and certain groups.

Seven years later, or in 1874, appeared the well-known classi-

fication of Garrod, who it may be said, almost entirely ignored Huxley's scheme by dividing the Class Aves into two subclasses — the first containing four orders and the latter three, or in other words two sub-classes and seven orders as compared with the latter's three. Garrod's initial scheme of classification is not thorough since we meet with such incongruities as the Cathartidæ being considered simply as a group in the same order with the Steganopodes, herons and others, while the Columbidae and the Gallinæ are widely separated, and the penguins are placed as a family among the Anseres, immediately following the Anatidæ, or the ducks, geese, swans and their allies. Still keeping before us, however, the main divisions of the class it is to be noted that ornithologists had little more than fairly grasped the Garrodian idea of avian relationships when in 1880, six years after its publication, Sclater proposed another scheme. In it the Saururæ of Huxley are not considered, — the class is divided into two subclasses, the Carnatæ and Ratitæ, the former containing no fewer than twenty-three orders, and the latter three others, or twenty-six orders of birds, where Huxley only recognized three; and these three orders Newton considers to be so many subclasses, while he would divide the Ratitæ into no fewer than six orders. These classifications were almost immediately followed by Reichenow in 1882 who divided birds into seven main groups which he called series, and these seven series were represented by seventeen orders. It is very different indeed from any of the foregoing schemes and cannot be contrasted with them without great difficulty, while its chief interest lies in the fact that he published in connection with it a phylogenetic tree of the Class Aves, one of the first attempts of the kind employed in ornithological science.

Within the next ten years a number of important classifications followed, — all provisional schemes for the arrangement of the Class, but none the less entitled to our best consideration, coming as they have from the pens of the ablest living ornithologists.

Stejneger's appeared in 1885; Fürbringer's in 1888; Cope's in 1889; Seebohm's in 1890; Sharpe's in 1891; and Gadow's in 1892. Of all these Fürbringer's is the most elaborate and

exhaustive, being accompanied by several vertical aspects and horizontal projections of his phylogenetic tree. Indeed, the objection brought against Furbringer's classification, principally by Gadow, is that it is too long and too elaborate for practical use. I do not fully concur in this opinion; moreover its author has, in many groups carried us a long way on the road toward determining the true relationships of birds and that, I take it, is the real goal we seek. In fact the converse of this would be an easy matter, that is to create a brief, artificial classification of birds based upon our present knowledge of the class, and adapted to the practical ends of the science. Any international congress of ornithologists, representatives from all parts of the world, could, in a few days, prepare such a scheme. But the problem is not to be settled in any such manner.

As it is we find hardly any more uniformity with respect to the schemes proposed by Stejneger, Fürbringer, Cope, Seebohm, Sharpe and Gadow, than is to be found among those of Huxley, Newton, Garrod, Forbes, Sclater, Reichenow, and others.

The majority of these schemes carry the classification down through the families, and, in special cases, in a few instances in each, through the sub-families. Huxley did not give the number of families in the Passeres, Garrod omitted the group entirely in his scheme; Sclater enumerated thirty-one of them; Reichenow but twenty-one; Stejneger thirty-three; Fürbringer reduced the typical Passeres to one single family, the *Passeridæ*; in 1889 the present writer recognized twenty families of the North American Passeres, and Sharpe the following year practically adopting the scheme, included all the old world representatives, and by so doing admitted thirty-five families as making up the passerine group,—and so on.

There is little need of carrying such comparisons as these into the higher divisions into which birds have been divided. We would but meet with greater variance of opinions, made the more deplorable from the fact that the wealth of coinage in new names renders the comparisons instituted even more perplexing. Then this perplexity is in no way diminished when a taxonomer takes it into his head to incorporate all the known fossil forms of birds into his scheme, as quite a number have done, and, very properly so.

It may naturally be asked, what are some of the chief reasons why the classifiers of this group of vertebrates do not exhibit a greater unanimity — a fact more remarkable when we come to consider that a dozen or more of those classifications coming from the pens of competent ornithologists appeared all within a very few years of each other. It is certainly not due to the fact that it has been demonstrated that birds have arisen from a prehistoric and extremely ancient stock of animals in common with the Reptilia, for knowledge of this character ought to have the tendency to harmonize views and opinions rather than to introduce the element of disagreement among them. We may eliminate too, I think, any difficulty that has arisen from the discovery of the few fossil forms of birds we have come in possession of, for many of these belong to the minor groups of existing birds, while others are not calculated to disturb a natural classification. Indeed, in some instances, they shed light on the subject. Again, in that existing birds are so completely differentiated from all other classes of animals now living upon the surface of the earth, ought to make them the easier to classify. They alone possess feathers and this establishes a line of demarcation for them, standing between the group and the nearest mammals or reptiles, quite as clearly defined as the possession of a mainspring separates all modern watches from an hourglass. The problem then presents itself in this wise, — to ascertain the true relationships both near and remote existing among all living birds, and then prepare as simple a scheme as possible expressing these relationships in terms that shall be in harmony with the classification schemes adopted in the cases of other classes of animals. In doing this, one of the first difficulties to arise is the marked homogeneity of the group. It is like classifying so many thousands of black, leather-covered hand cameras; they all look a good deal alike on their outsides, and the task would be equally difficult were we not permitted to examine into their interiors and ascertain the differences in their other parts, as the different kinds of lenses, finders, shutters, and other contrivances. Exactly the same thing obtains with birds. The great variance of opinions in the premises at the outstart is due to the difference in the amount of knowledge possessed by the different classifiers, especially as

to the characters presented on the part of the insides of the objects they are attempting to classify, although in saying this I do not underrate the value of the external characters.

The facts, then, that birds are a very homogeneous group and the knowledge of all their characters possessed by individuals who have attempted to classify them, has differed very widely in amount, is the first factor that will account for the great differences to be seen in the various published classificatory schemes. These are not the only reasons, however, and another very obvious one is the attempt made by some classifiers to ignore the homogeneity of birds, and to arrange them after the manner of the other great groups of animals, such as mammals or fishes. In other words, the attempt is made to employ the same divisional groupings from subspecies to class in the case of birds, where perhaps no greater differences can be found than exist between a thrush and an ostrich, as they do in the case of mammals, where such gaps exist as the one separating man and the ornithorhynchus. The objection is raised here at once, however, that an order of birds, for example, is a very different thing from an order of mammals. This is a knotty question, and as time forbids my discussing it here, I can only say that it leads directly to another very obvious reason for the differences seen in the various arrangements that have been proposed for birds, and that is this : — although ornithologists, in this country at least, may be pretty well agreed as to what is meant by a species, it is not clear that the same apparent unanimity of opinion exists among them in regard to what is meant by a genus, or rather what constitute generic characters ; and so on for families, suborders and other groups, until we arrive at the Class, and perhaps the Subclass, — groups, for evident reasons, again understood to possess the same value in all avian schemes of classification wherein they have been employed. The difficulty here is, no uniform laws have been drawn up setting forth for birds exactly what characters constitute specific characters, what generic characters, family characters, and so on up to Class characters. The consequence is that one avian classifier will employ subclasses in his scheme, which subclasses are designated in the scheme of another as super orders, or even as orders or some other divisional value in the scheme of a third

taxonomer, and so on for all those who have engaged in this difficult subject.

Finally, there is the great question upon which no two ornithologists now entertain similar opinions, and that is upon the various relationships of birds. Both this and the former question, however, depend entirely upon the amount of knowledge on the subject possessed by any particular taxonomer. The more exact and far-reaching this is, the nearer and sooner will he arrive at the truth.

In any event, it is very clear to me that the day is still far away when ornithologists will be agreed in reference to all these points. It is purely a matter of evolution, of development, and the acquirement of the necessary knowledge. Guess work will never attain the desired end, nor will any one man settle it. It seems to me, however, that we are in a position to discuss and settle one class of questions, that is in the case of birds, what groups shall be adopted in their classification, and what characters in birds themselves shall stand for those groups. For the rest the larger part of it depends upon substantially adding to our present knowledge of the morphology of these forms in its widest sense, and this to be supplemented by a very general knowledge of the entire life histories of all existing birds. From the very nature of things the latter advances with far greater rapidity than does the former, and we stand in great need of the addition of many more laborers in the fields of avian morphology. Death has materially thinned the ranks of this part of our army within a comparatively short space of time, and it has been principally the great captains of whom we have been deprived, — and we have by no means rallied from the loss of such workers in the anatomy of birds as Huxley, two of the Parkers, Gegenbaur, Garrod, Forbes, and other men of their calibre, power and influence, any one of whom would have said that the solution of the classification of birds lies in our commanding a knowledge of their history and structure.

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